School Shop

vol. XI no. 7
MARCH, 1952

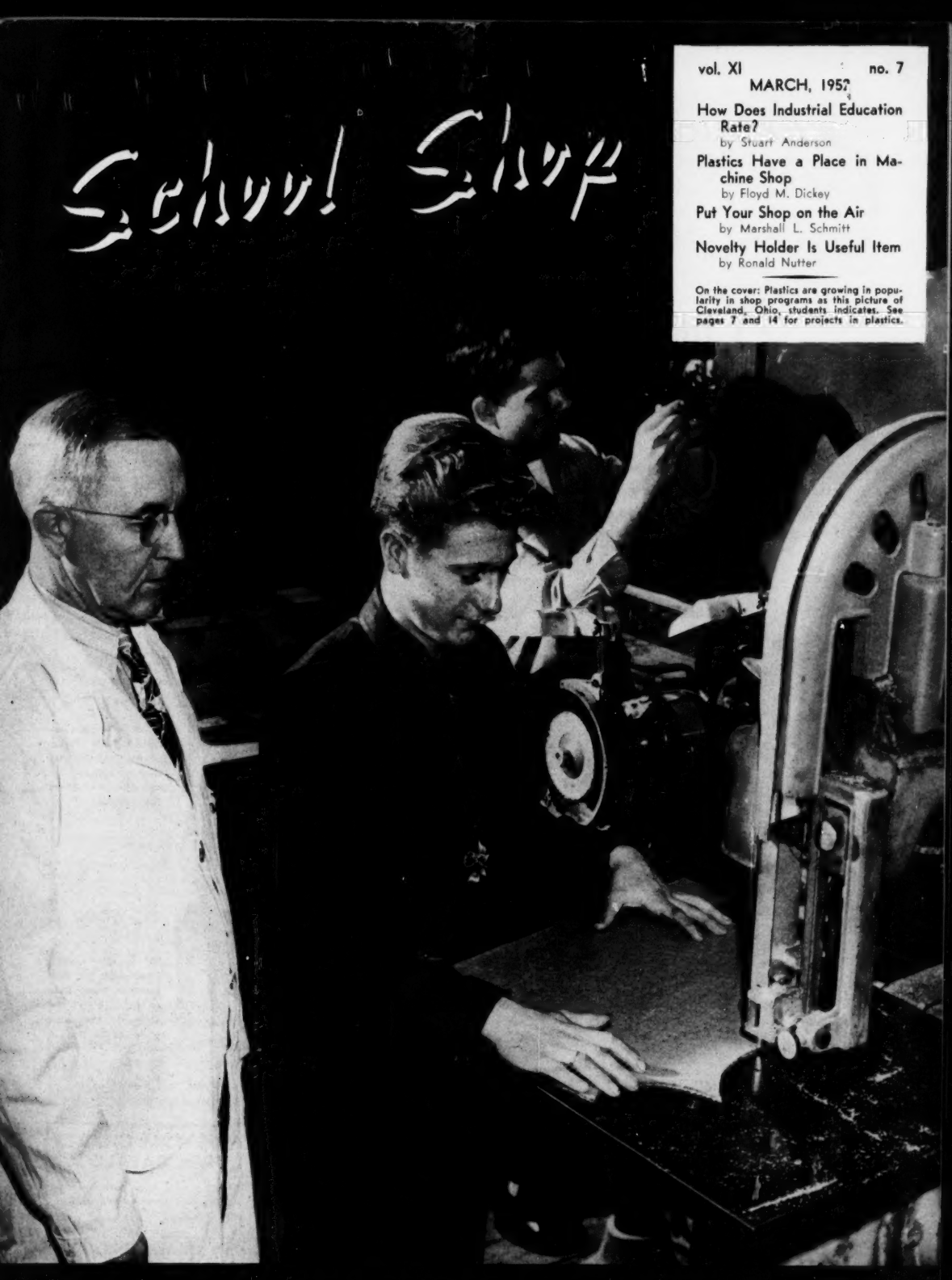
How Does Industrial Education Rate?
by Stuart Anderson

Plastics Have a Place in Machine Shop
by Floyd M. Dickey

Put Your Shop on the Air
by Marshall L. Schmitt

Novelty Holder Is Useful Item
by Ronald Nutter

On the cover: Plastics are growing in popularity in shop programs as this picture of Cleveland, Ohio, students indicates. See pages 7 and 14 for projects in plastics.



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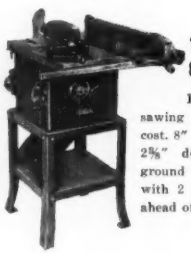

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School Shop

FOR INDUSTRIAL EDUCATION TEACHERS

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School Shop TALK

COMMENTS ON ISSUES FACING INDUSTRIAL EDUCATION

Our Best Ambassador

Each morning millions of our best ambassadors pour into our schools; each afternoon they troop home from our classrooms, and with them goes the greatest potential of all for molding the opinions of the owners of the public schools. Each evening, around the dinner tables of the nation the question is asked, "What did you do in school today?" and the answer to that question will determine opinion. It is, therefore, to be hoped that the answer will not stem from short-changing, perfunctory, dull-as-ditch-water teaching, but from the efforts of skilful, sympathetic, understanding teachers. For public relations —good or bad—start with the teacher in the classroom. The "top brass" may make speeches, join service clubs, write annual reports, and use the airwaves and press; but good public relations will not be achieved unless teachers send home satisfied customers. What the pupils think of the teacher the parents think; and what the parents think of the teacher and the school, most taxpayers in the community believe. For this reason the teachers must be the main strength in any school public-relations program—there is no better way to win parents and make friends than to send home a satisfied and satisfactory product.

In order that every teacher may become more conversant with the techniques used in developing good public relations, institutions training teachers would do well to require courses whose primary objective is to train teachers how to conduct themselves and their classes in such a way as to promote a healthy opinion of our public schools. School boards might do well to organize workshops in every school, so that principals and teachers, by concerted and sustained effort, would convince pupils and parents of the superior product being developed. For where good public relations have been built through understanding, skilful teaching, and cooperative planning, good schools will follow "as the night, the day" and the community will work to maintain high standards and be eager to furnish better equipment and pay higher salaries.

If we cannot offer and sell a product in such a way that we gain wholehearted support of the public, and if we cannot raise our school public relations to a satisfactory level, our children will be the victims of an inferior education just when our chances of survival as a democracy depend on a superior grade of educated citizen.—*A guest editorial by V. L. Pickens, Chairman, Division of Practical Arts, Vocational, and Family Life Education, Kansas City, Mo., Public Schools.*

Can He Do It?

In a recent issue of *Tech Training* James McKinney, Vice-President of the American Technical Society, discussed the relative importance of the development of skill and of general education as objectives in school-shop training. This is a problem which has received the attention of school men for several decades and, through the years, there have always been sharp differences of opinion on the matter. We are not sufficiently naive to suppose that we can convert either group to accept the philosophy of the other, but no harm should result from a brief examination of the points of view held by some educators.

Perhaps some of the attitudes manifested by certain school people may be attributed to the fact that we have two types of training going on in our school shops. The one we are concerned with here is designed to prepare young people for effective participation in a trade or industrial pursuit. In this area of training the development of skill is of primary importance, and general education is secondary. Skill is a "*must*" for a craftsman.

It is not suggested that a well-rounded general education is not desirable for a tradesman. It is. But, as far as his functioning as a mechanic is concerned, its value is practically zero.

The writer appreciates that this point of view will come as a shock to some educators. However, those who decry such a statement should realize that, when a craftsman asks for a job, his prospective employer is more interested in what he can do, and how well he can do it, than he is in his knowledge of science, history, or English. No one will dispute the value of these subjects but, for a tradesman, the main question is "How well can he perform the operations common to his trade?"—*T.D.*

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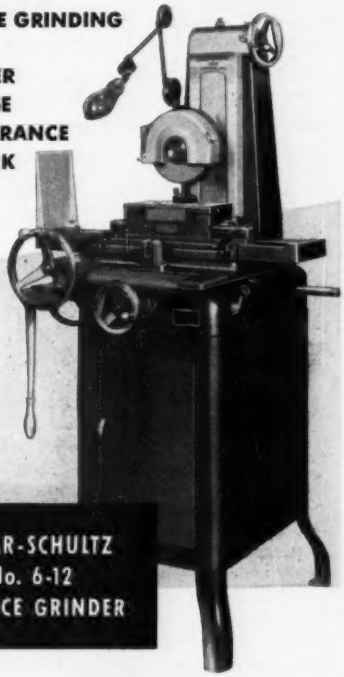

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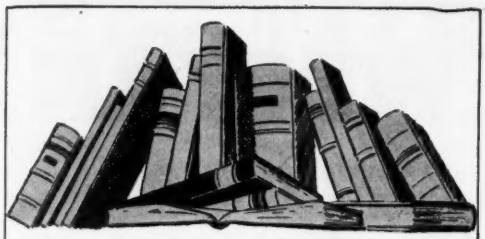

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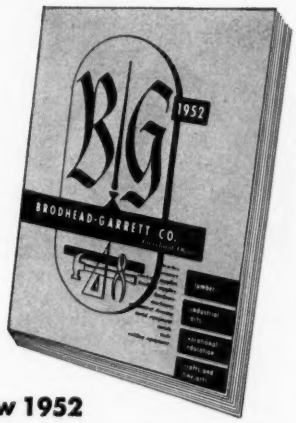

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How Does Industrial Education Rate?

By Stuart Anderson

The spotlight of consumer opinion has been turned on industrial education by students themselves in this article which raises some real issues which teachers should face. Dr. Anderson is Associate Professor of Education, The Stout Institute, Menomonie, Wisconsin.

The Technique

SINCE 1946 the Purdue Opinion Poll has given the results of opinion polls conducted three or more times each year among thousands of high-school students. This nation-wide poll, under the able direction of Dr. H. H. Remmers, has dealt with a number of timely subjects such as "Some Personality Aspects and Religious Values of High-School Youth," "Courtship Conduct as Viewed by High-School Youth," and "High-School Youth Looks at the Current National and International Crisis."

A recent report,[1] "Youth Looks Toward the Future in Education," publishes the results of a poll given by high schools to about 8000 pupils from all sections of the United States. Of these, a sample group of 2353 pupils was used so that the analysis could be as nearly representative as possible. The sample was stratified according to grade and geographical region, but it was strictly randomized from the total returns with respect to all other characteristics. The report contains some timely information for teachers of industrial education as may be seen from the following observations which have been taken from this study. The comments after each of the fourteen points are those of the writer.

The Findings

1. *Opportunities for practical work experience were favored by 85 percent of the respondents.*

Another recent survey revealed that in no community did the proportion of high-school students in the work experience program exceed 10 percent of the total enrolment.[2] In spite of the fact that youth want practical work experience, most high schools today do not include this program in their curriculum.

2. *Industrial arts, vocational education, or some kind of shop course is given in 84 percent of the high schools included in this survey.*

Although courses in industrial arts are generally accepted today as being a necessary part of a good curriculum, there are still many schools (16 percent) in which they are not offered. In terms of growth, however, this percentage represents a substantial increase in the number of industrial-arts shops in the United States.

3. *Sixty-two percent of the boys and 24 percent of the girls have taken, or intend to take, some industrial-arts courses.*

If we accept the thesis that some industrial-arts experiences are desirable for all boys and girls, it is somewhat of a challenge to realize that more than one-third of the boys and three-fourths of the girls have not had any shop work. Why? Is there need for making this work more attractive? However, in a recent survey on high-school enrolment trends by subjects, conducted by the U. S. Office of Education, industrial arts rated near the top.

4. *Industrial-arts courses have been taken by a larger proportion (45 percent) of the low-income group, as compared to 37 percent of the high-income group.*

Because college attendance today is so closely related to parental income, it is not surprising that a larger proportion of the children of the low-income groups have taken shop courses in the hope that such experience would help them develop or find some salable skills.

5. *Nearly 50 percent stated that, if they were to take industrial-arts courses in high school, it would be because they wanted to develop a hobby or obtain some experience with tools and materials; 29 percent felt that such training would help them get a job.*

Do we as industrial-arts teachers make adequate provision for the development of hobbies in our course planning? If not, we apparently are not meeting the expressed need of a large proportion of our clientele. Are we offering experiences in senior-high-school courses which will help that 29 percent who are taking shop because they think this work will help them get a job? How can we organize shop courses on the senior-high-school level which will better help students attain these two divergent goals?

6. *Only 6 percent replied that they would take industrial arts because they felt that it was a snap subject.*

Lack of "academic respectability" or status has long been the plague of industrial education. Some academicians have felt that shop courses were primarily for training the hands in the development of manual skills, with little concern for mental activity or problem solving. Perhaps there was a time when this criticism was justified, but it would hardly be true today. Students are quick to sense "snap" subjects; it is gratifying to learn that 94 percent of them do not consider industrial education in that category.

7. *Seventeen percent reported that they would not take industrial arts for any reason.*

Although it would perhaps be a bit unreasonable to expect all students, both boys and girls, to like industrial arts, it is somewhat disturbing to learn that 17 percent refuse to take the subject for any reason. Have we alienated this group? Is this attitude a reflection on the teacher, the area, or the student?

8. *Forty-two percent thought that high-school shop or industrial-arts training is of most value to a student because it helps him get a job; 41 percent, because it develops useful home skills.*

[1] H. H. Remmers, A. J. Drucker, and R. B. Kirk, *Youth Looks Toward the Future in Education*, Report of Poll No. 29, Purdue Opinion Panel. Lafayette, Indiana; Division of Educational Reference, Purdue University. (May, 1951), 15 pp. Mimeo.

[2] Stuart Anderson, "High-School Work Experience Programs in Action." *The American School Board Journal*, CXXIII (August, 1951), 18-19.

Although most industrial-arts courses on the high-school level are considered by educators to be exploratory in nature, rather than highly specialized or vocational, four out of every ten students who took shop subjects believed that the greatest value of the subjects lay in helping them get jobs. Do our courses actually justify this status? Do we really offer learning experiences which better qualify the high-school graduate to get a job? Perhaps academic teachers, guidance counselors, and administrators need to be better informed about the place and function of industrial arts in general education.

9. *If they were limited to one shop course, 43 percent would prefer to take general shop training, while 31 percent would elect special shop training.*

If you were hungry and were given a choice between one dish which included a variety of interesting foods and another dish which contained only one kind of food, which would you choose? Yes, apparently that's what the students thought, too. These results might also be interpreted to mean that those who were taking industrial arts for avocational reasons would find greater opportunities to realize this goal in a general shop, whereas those with definite vocational objectives would find greater opportunities in the unit shop of their choice.

10. *Nineteen percent of the boys and 12 percent of the girls felt that most high-school students look down on students who take shop training. Although only 11 percent of the ninth-graders expressed this view, 20 percent of the seniors reported it.*

Why does industrial arts lose status in the eyes of students as they go through high school? Perhaps it reflects the unrealistic attitude of some youth toward the world of work; more specifically, that kind of employment which involves wearing overalls, getting soiled hands, or carrying a dinner pail.

Because shop courses are taken largely by boys, it is interesting to note that approximately 50 percent more of the boys than girls felt that students who took shop courses were looked down on.

Or do some administrators still persist in that fictional dichotomy "that shop work is for the dull students and academic courses are for the bright ones."

11. *Nearly one-fourth expressed the feeling that a student who takes college-preparatory subjects has a better chance of gaining popularity among his fellow students than one enrolled in vocational subjects, while 56 percent held the opposite view. Twenty percent of the ninth-graders, compared to 32 percent of the seniors, expressed this view.*

Further evidence of the "status" value of academic courses is afforded in this view of student popularity. Again, shop courses tend to be held in low esteem by a larger proportion of the upper classmen than by the freshmen. What happens to boys as they go from the ninth to the twelfth grade? What happens to the industrial-arts course offerings during these same four years?

12. *People taking college-preparatory subjects have a better chance of being elected leaders in activities than people taking vocational subjects, according to 42 percent of the respondents; 40 percent opposed this view. Nearly half of the boys, compared to 35 percent of the girls, favored the college-preparatory group, 35 percent of the ninth-graders, contrasted with 52 percent of the seniors, shared this view.*

Why do boys, particularly seniors, believe that there is a better chance for student leadership for those taking college preparatory subjects than for those who take vocational subjects? Does it mean that the former are attracting a larger proportion of the qualified leaders; that shop training attracts a less desirable caliber student?

13. *Exactly 41 percent of those planning to go to college or business school after graduation would take a general-shop course or an industrial-arts course if one were available in the high school. This opinion was expressed by 43 percent of the low-income group compared to 34 percent of the high-income.*

In organizing our industrial-arts program do we make adequate plans for the hobby potentiality of each course? Apparently there is a need for considerable flexibility in shop offerings in the senior-high school today, ranging from exploratory and hobby to technical-vocational activities. With present limited shop facilities, most schools might well consider developing a cooperative work-experience program for the latter group.

14. *More than two-thirds replied that they would like to take a course in high school where time is spent learning how to repair articles used in the home.*

Do you offer a home-mechanics course in the senior-high school? How long can we continue to ignore the wishes of more than two-thirds of our customers and still purport to be meeting their needs? Seniors, particularly girls, are not far removed from the responsibilities of managing a home. Some mechanical know-how is an important asset for the modern homemaker in our highly mechanized society.

In Conclusion

It is well for teachers to "put an ear to the ground" and listen to what the consumers of our educational program think about it. Fortunately this has been done for us, nationally, in the Purdue Opinion Poll and we can profitably evaluate the findings. From this research, shop teachers will find evidence of certain educational deficiencies, as well as commendations, in current practice. Because these young people are the future taxpayers and parents, their opinions are tremendously important. We cannot afford to ignore or alienate this group of embryonic citizens! Let us closely examine these fourteen points and make a greater effort in our industrial-education program to better serve the needs of youth today. ★

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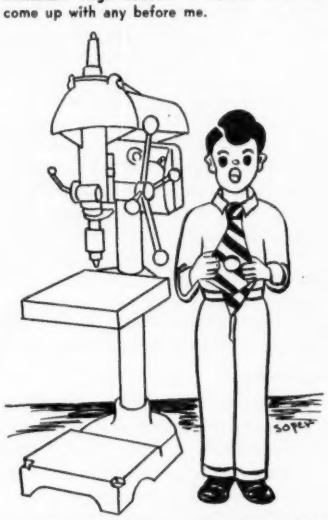
Coming Next Month

SCHOOL SHOP's annual Directory Issue will appear in April with full coverage of "Safety in the School Shop" as well as the helpful Suppliers Directory and the Directory of Federal and State Officials. Don't miss next month's issue!

Shop Tickler

This one was new in one of my classes at McKenzie High School. I wonder if it has come up with any before me.



Instructor: "Why is it a good idea to keep your necktie inside your shirt when working on power tools?"

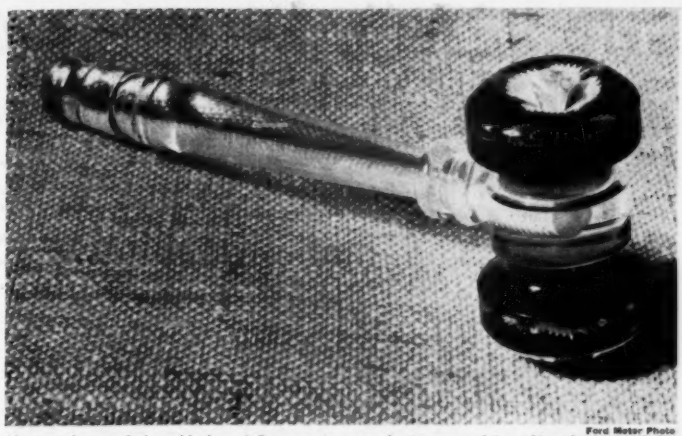
Student: "Well, it would be too bad to drill a hole in a good necktie."—*Don Zwickey, Supervisor, Parochial Schools, Archdiocese of Detroit, Mich.*

[ED. NOTE: Readers are invited to contribute short humorous items, illustrated or not, from their teaching experience to this new department of SCHOOL SHOP.]

Plastics Have a Place in the Machine Shop

By Floyd M. Dickey

This gavel is an excellent project for demonstrating that the acrylic plastics can be fabricated in the machine shop as well as in craft classes. The gavel won second prize in the Ford Industrial Arts Awards for its maker, student Kenneth Dillon of the John Adams High School, South Bend, Indiana, where Floyd M. Dickey is a teacher of industrial arts.



Ford Motor Photo

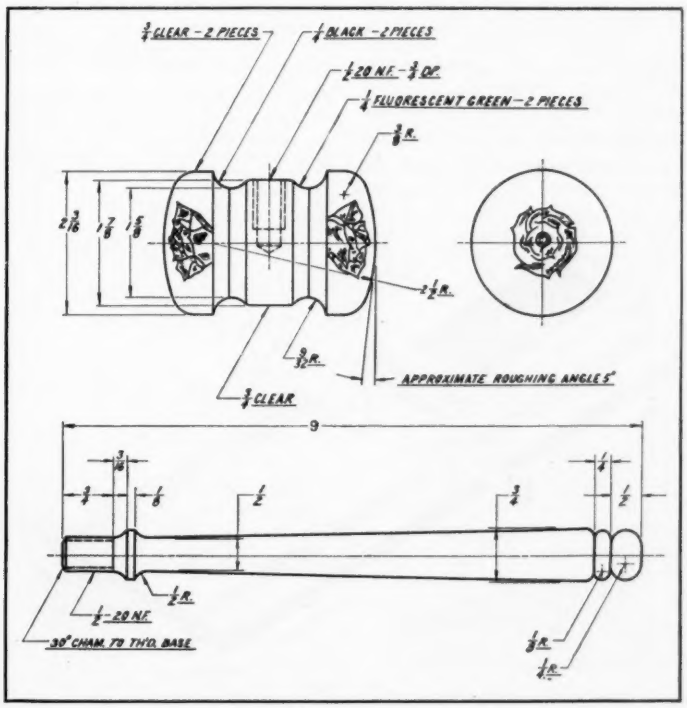
Alternate layers of clear, black, and fluorescent green plastic are used in making the head of this plastic gavel which has internally carved flowers in each end of the head for decorative purposes.

TESTED 55 PROJECT

ONE way of creating new interest in the machine shop is to produce new material to work with, namely: plastics, heretofore considered to belong exclusively in the craft classes. In machine-shop work it is desirable to have students learn to machine materials other than metals, and plastics provide a new and interesting teaching medium in this field.

In making the plastic gavel, attractive designs and multiple operations are combined to produce a useful and unique effect. Many students have made these gavels and presented them to various school and local organizations: PTA, DeMolay, Rotary Club, Rainbow, and others.

The gavel head consists of seven pieces of plastic cemented together with a plastic solvent. Different combinations of colors may be used in building up the gavel head. Two pieces of ¾" Plexiglas are used for the faces of the head, and a flower design is internally carved in this face piece and appropriately dyed. A black backing, glued to the carved piece on each end, reflects the colors in the carving. After all the pieces have been cemented together in a solid block, the head is placed in a four-jaw chuck and turned to a cylinder, then shaped to the desired form.



In turning the gavel head, the student learns how to grind forming tools and the correct rake to put on his tool for cutting plastics. The piece is polished in the lathe by using a very fine grade of sandpaper (no. 6/0 is recommended) and then finished with pumice stone and a damp cloth. After the piece has been polished on the lathe, it is buffed on a buffing wheel to give it a higher luster. A hole is drilled and tapped for the handle, with care being taken to get the hole drilled true.

The handle for the gavel may be glued up of several pieces, but a plain Plexiglas rod is very satisfactory. In turning the handle, the taper attachment on the lathe is used to get the proper taper. The threads are cut with a die, and these, too, must be true. The handle is polished the same as the head, using a file, fine sand paper and pumice stone, and finished on the buffing wheel.

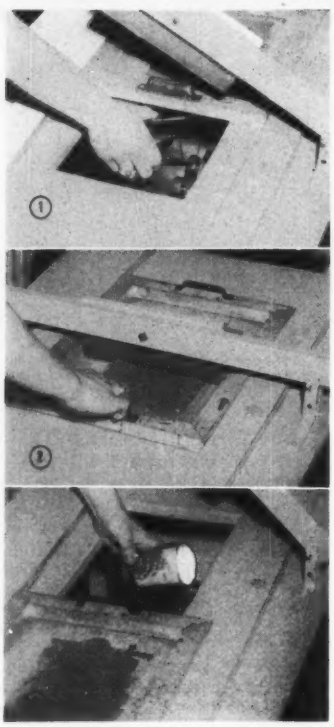
In assembly, a solvent should not be used to hold the handle in the head. We found that the solvent cracks the plastic at the thread base of the handle and causes it to break.

In making this project, students discover a new interest in machine work. They learn simple carving, cementing, form-tool grinding, taper turning, drilling, tapping, and polishing. ★

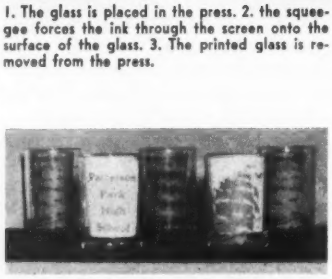
Silk-Screen Drinking-Glass Press

By H. LeRoy Marlow

This unique silk-screen press is an excellent addition to the graphic-arts facilities as it illustrates a common type of work which is often overlooked in the school shop. H. LeRoy Marlow teaches graphic arts at the Patterson Park High School, Baltimore, Maryland.



1. The glass is placed in the press. 2. the squeegee forces the ink through the screen onto the surface of the glass. 3. The printed glass is removed from the press.



Lettering or designs look equally attractive when printed on drinking glasses.

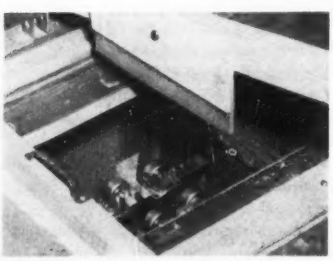


Fig. 2. Close-up showing the rack on which the glasses are placed. The screen is in the lower corner while the squeegee is just above printing position.

THROUGHOUT the nation today silk-screen printing is being offered in an ever-increasing number of schools. The silk-screen process appeals to students and administrators alike as the process is economical and yet produces results which far surpass other more expensive means of reproduction.

With the idea of expanding the graphic-arts shop this silk-screen drinking-glass press was developed especially for use in the schools. This article explains the construction of a machine by which it is possible to silk screen any desired design on a drinking glass.

The idea of screening a design on glass is not new; it has long been done commercially on such articles as milk bottles, cosmetic jars, and perfume bottles. However, the machines which are used commercially are costly ones and not within the reach of the school. The plans here make it entirely possible for a teacher to construct, with very little additional help, a machine with which one may successfully silk screen bottles, drinking glasses, and the like.

Required Parts

A careful study of the plans will simplify the job of constructing this piece of equipment. Some of the parts will require a bit of tooling that any student can do in the machine shop. All of the required parts are designated by the following letters:

A: Frame—constructed the same as conventional silk-screen frames; one required.

B: Silk or cloth—stretched on the frame by an approved method.

C: Handle—screen-door pull or drawer handle of convenient size; two required.

D: Tongue-and-groove flooring — pieces of hardwood flooring the length of the table, tongue to engage part *A*; two required.

E: Squeegee — constructed according to the sketches shown in Figures 13 and 14; one required.

F: Lever—for putting tension on squeegee; one required.

G: 3″ angle bracket—pivot point for part *F*; two required.

H: Table—desired size with hole cut in the middle; one required.

J: 3″ angle bracket—guide for part *F*; two required.

K: Metal block—dimensions shown in Figure 9; two required.

L: Set screws—¼″-20NC, locks parts *K*, *N*, and *M* in desired position; four required.

M: ⅜″ steel shafting — width of the table, threaded 2″ at both ends, ⅜″-16 NC; two required.

N: ⅜″ steel shafting—12″ long, threaded 2″ at one end only, ⅜″-16 NC; two required.

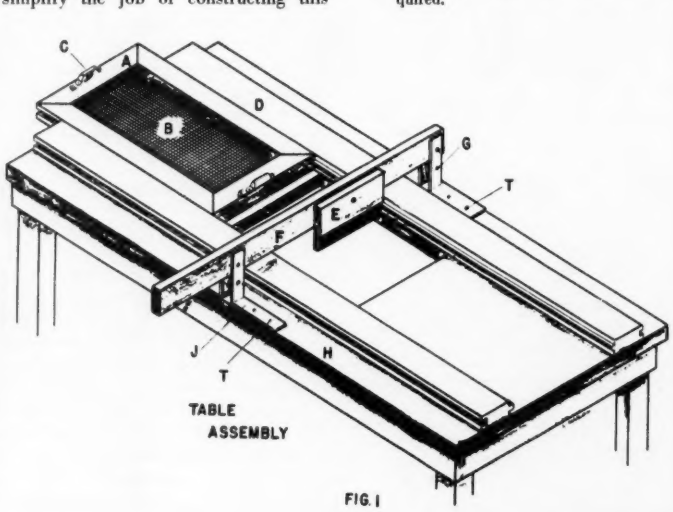


FIG. 1

O: Casters—ball bearing, Bassick # 5625 or similar; four required.

P: ¾" angle iron—7½" long, drilled as shown in Figure 8; two required.

Q: ⅜" nuts—to fasten parts *N*, *P*, and *R* together and part *M* to the table; ten required.

R: Adjustable glass stop—sheetmetal as dimensioned in Figure 12; two required.

S: ⅛" bolts and nuts—to fasten parts *O* to part *P*; eight required.

T: Wood screws—to fasten various parts to table.

Machine Adjustments

Before the machine is put into operation, there are several things that should be checked. The top of the glass must be as nearly level as possible and the squeegee must rest along the entire length of the glass. This is made possible by having the squeegee fastened to part *F* by a bolt through the center of the squeegee. The position of the glass is adjusted by means of the set screws (part *L*) found in part *K* which permits *K* and *N* to move vertically or horizontally as desired. The blade of the squeegee must rest on the longitudinal center line of the glass at all times. Friction between the glass and the silk must be greater than the friction between the casters and the glass or the glass will not rotate, thus preventing transfer of the design.

After the caster assembly has been positioned, place the glass on the casters (*O*), adjust the glass stop (*R*), pour the necessary amount of paint in the frame (*A*), raise the lever (*F*), and slide the frame so that it is under the squeegee (*E*). A uniform downward pressure should be maintained on the lever as the frame is pulled from one side to the other. The design will print on the glass as it rotates on the casters.

If the casters are of the swivel type, and these are recommended because of their steel bearings, it may be necessary to prevent an azimuth motion. This can be accomplished by wrapping a rubber band around the bearings, thus causing enough drag to prevent such movement. Do not prevent the rollers from rotating.

It will be necessary to remove the surplus paint from the blade of the squeegee before removing the frame from under it. This will prevent the paint from dripping onto the machine and floor.

If the design appears on the glass but has a smeared appearance, the squeegee is not resting on the container's longitudinal center. If only the top or bottom of the design appears smeared, then only that end has moved off center. This may be corrected by loosening the set screw, adjusting the position of *K*, and retightening the screw. The caster assembly may be kept on the center line of the squeegee more easily if the shaft, *M*, is pinned to the table so that it cannot rotate.

Development of a Design Stencil

In laying out the design the circumference of the glass must be taken into consideration and the design so made that the end will not overlap the beginning. It will likewise be necessary to consider the position of the caster rollers in relation to the design so that the rollers will not smear the already printed design. If desired, the amount of roller area in contact with the glass may be decreased by gluing a rubber band around each roller; thus, the glass will rest on the rubber band rather than on the whole area of the roller. It will be necessary to cut the band to get it around the roller, but a coat of shellac will hold it permanently in place.

If the design is of such a nature that it is to appear horizontally on the drinking glass, then the taper of the glass must be taken into consideration. If

(*Continued on page* 26)

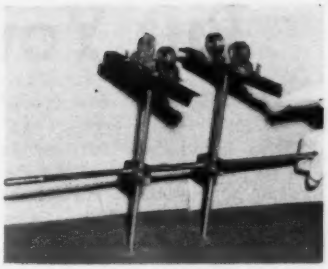


Fig. 4. Caster assembly showing blocks with set screws for adjusting height and width of casters.

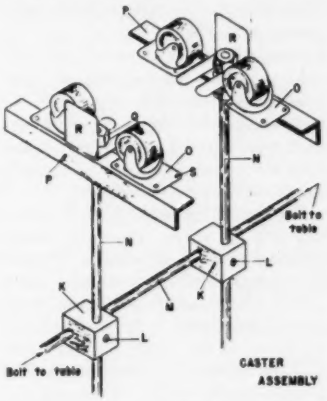


FIG. 3

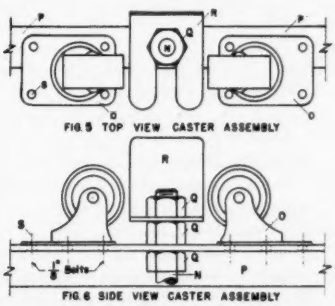


FIG. 5 TOP VIEW CASTER ASSEMBLY

FIG. 6 SIDE VIEW CASTER ASSEMBLY

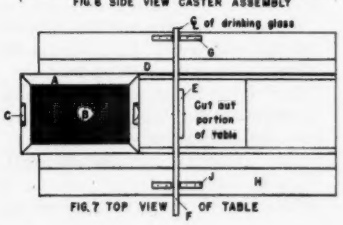


FIG. 7 TOP VIEW OF TABLE

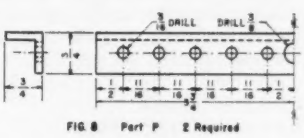


FIG. 8 Part P 2 Required

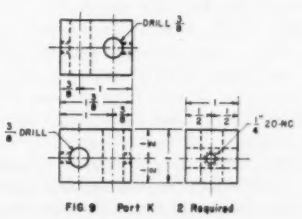


FIG. 9 Part K 2 Required

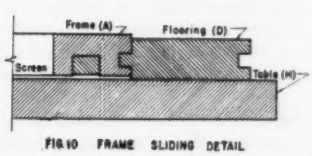


FIG. 10 FRAME SLIDING DETAIL

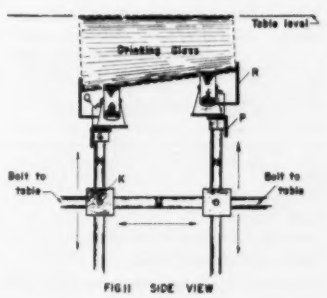


FIG. 11 SIDE VIEW

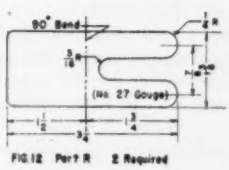


FIG. 12 Part R 2 Required

Put Your Shop on the Air

By Marshall L. Schmitt

Here is an original radio play that can be used to interpret the industrial-arts program to the public. By this means portions of the public who will not be reached by open houses or news stories can learn about your program. Marshall L. Schmitt is Associate Professor of Industrial-Arts Education at North Carolina State College, Raleigh.

AS an industrial-arts instructor in the public schools I was frequently asked by laymen—usually mothers and fathers of my students—What is industrial arts? or What is the shop like? Did I still teach wood joints? Were the students still making "breadboards" or "broom holders?"

An effective way of answering these questions, I found, was to have the mothers and fathers visit the shop to see what was being done and to ask questions. Then I was able to point out the real purposes of the shop course and what was being accomplished. Questions were asked not only about the shop but about education in general.

But not all interested persons can or will visit the shop. The radio offered a means of communication with many more people than shop visitation could.

This 15-minute radio program is an attempt to correct a misconception in the minds of the public that the industrial-arts shop is the same as the old manual-training shop. It shows that industrial arts is a diversified activity program and a part of the general education of all boys and girls. Other purposes are: to show the public that the schools belong to it; to encourage participation in school affairs; and to reemphasize the function of the school.

This radio play was broadcast over Station WOPT, Oswego, New York.

YOUR SCHOOL SHOP

(A play for radio)

By Marshall A. Schmitt

CAST

John—A high-school senior in a modern high school
Harold—A new student from a rural high school
Mr. Stark—The industrial-arts instructor
Bernie—A student in the industrial-arts shop
Joan—Sister to John, also student in the industrial-arts shop
Jim—A student in the industrial-arts shop
Narrator—An industrial-arts instructor
Announcer—Station announcer at WOPT

Time: Present
Length of Broadcast: 14 min., 30 sec.

MUSIC: UP AND FADE.

Announcer: Tonight the Oswego State Teachers College presents a dramatic play entitled "Your School Shop."

MUSIC: UP AND FADE.

Narrator: If you were a stockholder in a huge company wouldn't you want to be informed of the way it spent its money . . . . or should I say your money? Believe it or not, you are a stockholder in one of the biggest businesses in the country . . . . What is that business? . . . Your public schools. Yes, you are a stockholder in an industry that is valued at over 13 billion dollars—an industry that employs over one million teachers—an industry that utilizes the most precious of resources . . . the 32 million youngsters that attend. You should know what your schools are doing today, where they spend their money. Visit them. Go to "open school nights." Attend the adult programs. Talk to the teachers and administrators.

Today I'd like to tell you about a relatively new program in the public schools called industrial arts. You probably don't recall the name but if I mentioned that it was a shop course you probably would think of the old manual-training shop that was offered years ago. However, instead of me telling you about the industrial-arts shop, as it is called today, I would rather you listened to a conversation between John and his friend Harold. John is a senior and will graduate this coming June and Harold, a sophomore from a small rural high school, is going to enroll for the first time today. They are just walking down the corridor.

SOUND: FOOTSTEPS UP AND OUT.

John: Hi, Harold.

Harold: Hi, John. Boy it's hot today. Say, where did you get the model sail boat? Buy it?

John: No. I made it.

Harold: Gee, that's keen. What did you do, buy a kit from the store?

John: Heck no. I designed it myself and built it in the shop at school. Don't you have a shop in the school you came from?

Harold: No. We didn't have a shop that we could work in at our school. Dad and I worked a little in a small home workshop; that's all.

John: I just showed this model boat to my dad. We're planning on building a large one together this summer. I learned a lot from making this model. Do you know anything about boats?

Harold: Not very much. I never had the opportunity to learn. Golly, that's sure a nice boat. What's that little thing on the back?

John: Oh, that . . . that's the tiller. You steer the boat by it. The front is called the bow, and that's the bowsprit.

Harold: Gee, I wonder if I could make one like that.

John: Sure. It's easy . . . I'll show you the shop where I made the boat . . . it's right around the corner. You can meet the industrial-arts teacher. He's a swell guy. I even come in and work in the shop on Saturdays, and once a week the shop is open in the evening. Dad usually comes down then . . . He's making a coffee table.

Harold: I sure would like to see the shop. I guess I'll have time. I'm supposed to go to the principal's office for my class assignments, but . . . a few minutes won't hurt.

SOUND: FOOTSTEPS IN AND OUT.

John: Well, here we are. There's the shop. See the sign above the door?

Harold: "Industrial-Arts Shop" . . . What kind of a shop is that?

John: Come on in and I'll show you.

SOUND: DOOR OPENS — SHOP SOUNDS IN AND UNDER.

Harold: Gee, they do all kinds of things in here, don't they?

SOUND: DOOR SHUT—SHOP SOUND OUT.

John: You bet. There's Mr. Stark. Come on over and meet him.

Harold: OK. (BOARD FADE) I would like to very much.

John: Mr. Stark, I'd like you to meet Harold Simpson, he's a new student here . . . just came in today.

Mr. Stark: Hello, Harold.

John: I was telling Harold about the shop . . . mind if I show him around?

Mr. Stark: No. Go right ahead . . . John, why don't you first take Harold over to the welding outfit? . . . One of the boys is using the cutting torch . . . Don't forget to put on a helmet to protect your eyes.

John: OK. Over this way, Harold.

SOUND: HISSING SOUND IN AND FADE.

Here Harold, put on this helmet and

look at the torch through the dark glass.

Harold: (Muffled) Golly, you can see swell. Say, what's he working on?

John: (Muffled) Look's like he is making a trailer hitch. His folks just bought a small one-wheel trailer for the car.

SOUND: MUSIC IN AND OUT.

Harold: What's that . . . music while you work?

John: No . . . . but when some big national event is on the air we tune in and listen. That music you just heard is coming from the electrical area in the shop. Look's like Bernie Hale is working on a radio set. Want to go over and watch him?

Harold: Sure. I'm interested in radio.

SOUND: MUSIC IN AND OUT.

John: Hi, Bernie . . . meet Harold . . . He is new here. Just came in today.

Bernie: Hi, Harold.

Harold: What are you doing, Bernie?

Bernie: Oh, I built this radio and it doesn't seem to work just right. I've got to make a few more adjustments.

Harold: No kiddin'. Did you really make that radio?

Bernie: Sure. This is the second one I've made. The first one didn't have enough power so I got some old parts from the radio shop downtown and made this one.

Harold: What's that over there?

Bernie: That's a telegraph code set. I use that for sending messages to my friend's house at home. We rigged up a two-way telegraph set and talk to each other. Want to hear it work?

Harold: Yes, I would.

SOUND: TELEGRAPH IN AND OUT.

Bernie: Do you know the code?

Harold: No. It just sounds like a lot of clicks to me.

Bernie: It takes a little time before you can send like that. I've been studying code over a year. I'm trying to get an amateur radio license so I can send messages over the air.

Harold: You mean you can have a broadcasting station of your own?

Bernie: Yes, but first you have to pass a test. My brother has been operating a station for six years. He has lots of fun with it. Once he talked to a radio operator in Alaska.

Harold: That far away?

Bernie: Oh that's not so far; some fellows transmit messages a lot farther than Alaska.

Harold: How'd your brother learn so much about radio? Did he go to a radio school?

Bernie: No, he got interested in radio when he had industrial arts in high school and it's been a hobby with him ever since.

SOUND: MUSIC UP AND OUT.

There now I've got it. How does that sound?

SOUND: MUSIC UP AND OUT.

Harold: Sounds good to me.

John: Come here Harold. My sister Joan just came in (BOARD FADE). Hi, Sis. Meet Harold Simpson.

Joan: Hello Harold . . . Say John, want to see the clay pieces I made? I'm just going to take them out of the kiln.

Harold: What's a kiln?

Joan: Well . . . come here and I'll show you. *(Pause)* See this large oven-like furnace. After the clay pieces or wares are moulded, either by hand or on a potter's wheel, they must go into the kiln and be heated to a very hot temperature to make the clay hard and useable. Sometimes the ware is heated twice so that it can be glazed. After that, they look just like your dishes at home . . . See . . . Here is my sugar bowl and creamer.

Harold: Gee. They look nice; good color too! Is it hard to do?

Joan: No . . . but it's tricky. You don't want to start anything like this the first time but you'll soon get the knack of it and be OK.

John: What-cha going to do with 'em Sis?

Joan: I'm going to give them to mother on her birthday next week . . . Well I've got to run . . . Glad to have met you Harold . . . So-long.

John: So-long Sis.

Harold: Bye.

SOUND: SAWING OF WOOD IN AND OUT.

John: Come over here Harold and look at the book shelf this fellow is making. (BOARD FADE.) Hi, Jim, meet Harold.

Jim: Hi, John . . . Hi, Harold . . . You're new here aren't you?

Harold: Yes, I just came in today. John has been showing me around the shop. That's a pretty nice book shelf you've got there. What kind of wood is it made from?

Jim: It's made from oak . . . I'll have it finished by the end of the week, that is, if everything goes all right. I had trouble sawing the dado joints, but I guess it will be OK now. I would have finished it sooner but I was making a scarf last week for my mother.

Harold: You mean you make scarves here too?

John: Sure. I'll show you . . . That's the loom over there.

Harold: Where?

John: See, over by the window next to the shop library.

Harold: Oh yeah, now I see it . . .

John: You see these small metal pieces in the loom?

Harold: Yes.

John: Well, they're called heddles and through the eyes in the heddles the warp is threaded. Do you know what the warp is?

Harold: No . . . Never even heard the word.

John: That's the name given to the threads that make the main part of the scarf, rug, or whatever you're making. After they are all threaded and tied in place the filler, or woof, is then woven in between every other warp thread. Sounds kind of complicated, but really it's easy and lots of fun.

Harold: You seem to know all about the shop. Have you taken industrial arts long?

John: Oh yes, I took it in junior high and in senior high. I can run all the machines in the shop.

Harold: Even that metal lathe over there?

John: Sure. I made a part for my .22 rifle on it. All of us fellows can do all kinds of things in this shop. Last year five of us built a milk house for Mr. Reynolds. He lives up the road a ways. He hurt his leg last winter, and has been sorta crippled ever since.

Mr. Stark: Hi, fellows.

Harold: Hello Mr. Stark.

John: Hi.

Mr. Stark: Well, Harold, did John show you around the shop?

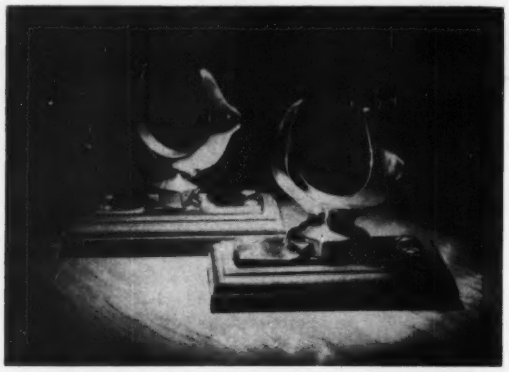
Harold: Yes he did. Golly you sure do everything around here. I wish I could have had shop in the school I came from. Us kids sure missed a lot.

Mr. Stark: I imagine your school will have an industrial-arts shop before long. You see, there is a lot of benefit that young lads like yourself can get from a shop of this kind. It's not like the old manual-training program that was offered when your father and mother were in school. In the industrial-arts shop you fellows can work in any one or all the areas of the shop, depending on your interests. You probably noticed the signs over the tool boards. They designate the areas of the shop. Over there are metalwork, electricity, and woodworking; and on this side of the shop are ceramics, textiles, and printing.

(Continued on page 25)

Oarlocks:

By Thomas J. Brown

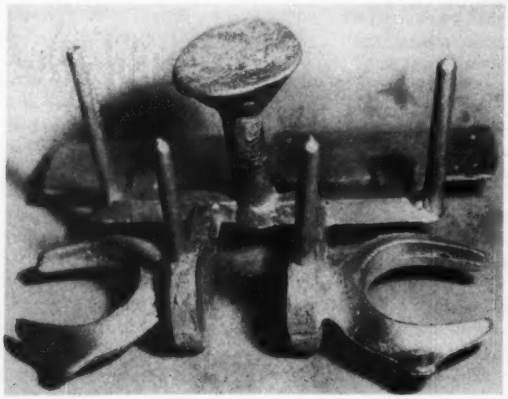


Bronze oarlocks mounted for exhibition purposes.

Oarlock pattern embedded in sand for false cope.

Flat-back parts added to false cope from which the drag is completed.

The finished casting in manganese bronze showing gate and vents before finishing operations of filing, polishing, and machining were completed.

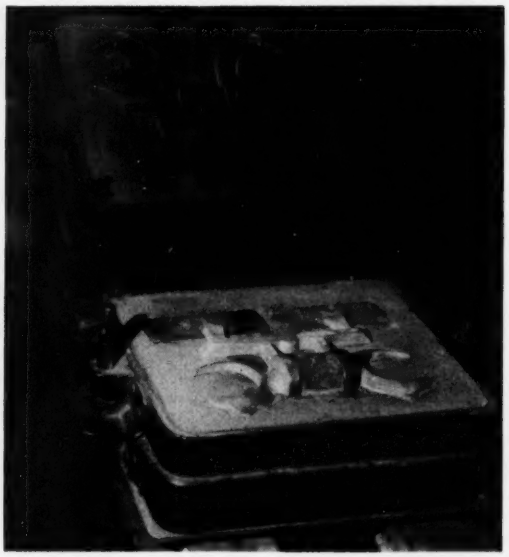


This project was constructed with enthusiasm by the pupil because it gave him an opportunity to fill a real personal need. The foundry program at Lane Technical High School, Chicago, Illinois, is set up so that extra projects such as this one can be worked into the course. Thomas J. Brown teaches foundry at Lane.

THESE bronze oarlocks were made by Robert Wilk, a student in the foundry department of the Lane Technical High School, Chicago, and won for him recognition in the Ford Industrial Arts Awards competition. Before describing the processes involved in making the oarlocks, I will present a brief description of the work in foundry at our school as it is considerably different than that offered in an industrial-arts shop program.

In our foundry course we offer practical molding, furnace tending, and core making. We use a lecture room in which the students study the source, distinctiveness, and purposes of materials used in

The cope has been lifted off and the patterns are about ready to be drawn.



a foundry project with a purpose

the foundry. In the finishing room the students learn to file, polish, and finish the castings made in the foundry. Emery wheels, grit wheels, and buffers are used.

A boy in the Lane foundry program must follow a definite sequence of jobs. These are outlined in the "Student's Progress Sheet" below. He starts with the simple flat-back patterns and casts two school emblems as required work. The boy who adapts easily and does a good job can make house numbers, Chicago signs, faceplates or anything he desires to cast in the flat-back class.

His next unit of work is the irregular pattern in the form of a metal ash tray. From this he learns to make castings to put on his school emblem. These castings are required work which must be taken to the finishing room for completion. The superior boy is eligible to cast metal airplanes, propellers, and other irregular-pattern projects he may wish to try.

All boys mold the split pattern in the form of an anvil. Outstanding boys make boat anchors, vises, and other castings in which they develop their skill in split-pattern work.

The next job is either temporary or permanent match work. The boys learn this by making a toy bathtub which they embed in a false cope. This is required work. Superior students have time to make frying pans, Dutch ovens, and other items such as the oarlocks illustrated here.

Each of the preceding five units has certain definite requirements that must be met to enable a boy to receive his foundry credit. The fundamentals keep some boys busy, but others have time to make additional castings, thereby increasing their knowledge and skill.

Wilk, one of the superior boys, made the oarlocks as an extra project in the match-work unit. He brought in an old, broken oarlock, patched it with modeling clay, and started to work as the pictures show.

First he made an extra pattern so that he could cast one complete set in one pouring. The first picture in the casting series shows his patched oarlock and pattern embedded in the sand for the false cope.

The second picture shows the flat-back parts in the false cope from which he completed the drag. On top of the completed drag he placed the runner and gates which had already been tested. He then proceeded to make the cope. In the third picture he has lifted off the cope and is about ready to draw the patterns.

Next he used a sprue cutter to cut the sprue and a small pipe to cut the vents or risers. The mold was then ready and he poured the manganese bronze. The completed casting is shown in the fourth picture.

Wilk cut off the gates and vents or risers and then took the castings to the finishing room where he filed and polished them. He went to his former machine-shop teacher and secured permission to machine the parts. In his former woodshop he was able to make mahogany stands on which to mount the finished oarlocks. The feeling of achievement and accomplishment made Wilt a happy boy. ★

This chart is used for the first semester of work in the foundry.

Student's Progress Chart

Name——— Class——— Bench———

Learning Units	Periods	Essentials Taught In Process	Name of Pattern	Grades
I. Tempering sand	2	Care of molding sand	Simple flat back	
Flat back	4	22 basic operations	Green core	
10 period inst.	2	Use of nails	L. T.	
		Plate with inserted gate	2 castings	
II. Coping down	4	Using & drawing metal pattern	Leaf Prop. 2 blade	
Metal pattern	2	Using slick in coping down	Model plane	
8 periods inst.		Cutting multiple gate	Head 1 casting Prop. 3 blade	
III. Split pat.	4	Pattern in cope	Anvil	
8 periods	4	Rapping pattern through cope	Machine vise Engine block	
inst.	4	Loose part in pat.	Air-bomb cast.	
	4	Risers' shrinkage		
IV. Temporary &	4	False cope	Bathtub	
permanent	2	Plaster match	Prop. 3 blade	
matches	2	Follow board	Frying pan	
6 per. inst.	2	Oil & sand matches	Plowshare	
V. Hanging core	6	Soldiers, nails, gaggers	Bathtub	
Setting dry core	10	Chaplets, burlap	Shell casing	
4 per. inst.				
VI. Match plate	2	Attached gates	Flat side	
	4	Strainer core in sprue	Double side	
	4	Strainer core in gate	Using plate	
6 per. inst.	2	Runner-branch gate	On jolt mach.	
VII. Dry sand	2	Mixing, binders,	Machine vise	
core making		baking	Core	
2 per. inst.	2	Venting, pasting, & reinforcing	Fire iron	
VIII. False	2	Double parting	Pulley	
cheek		Double roll		
IX. Three-part	4	Cheeks, headers	Anvil	
flask		Vertical methods in molding	Pistons for gas engine	
4 per. inst.				
X. Floor	16	Use of clamps in roll over. How to handle heavy work	Andirons Fire iron	
molding				
10 per. inst.		Floor ramming built-in core		

From Behind the Iron Curtain

Certain vocational schools in the U.S.S.R., grouped under the name of "Schools of Labor Reserve," are under the jurisdiction of the Ministry bearing the same name, according to the International Bureau of Education. Such schools include: (1) factory and mill schools (F.Z.O.) where workers are trained for unskilled trades; (2) railway schools; (3) trade or apprenticeship schools, training skilled workers. The F.Z.O. schools have a curriculum lasting six months to a year according to the trades taught; the other two offer a two-year course. Practical experience, theory, and physical culture are stressed. Boys and girls, having from four to eight years of schooling are accepted. Recruitment is by mobilization, each district being expected to furnish a certain quota.

Molded Plastic Picture Frame

By Robert J. Schaefer

This plastic project involves many basic processes and uses of tools, yet can be constructed with very little equipment. Robert J. Schaefer teaches industrial arts at the Medina, New York, Public Schools.

TESTED 55 PROJECT

THIS little plastic photograph holder is suitable for both elementary- and junior-high-school students and quickly arouses their interest.

The frame can be constructed with very little equipment and involves many basic processes and uses of tools. Variations can be worked into it such as variety in internal carving and dyeing of clear plastics, different sizes, colors, etc.

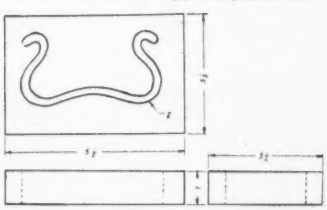
This plastic frame can be varied in shape, size, coloring, by internal carving, and other methods.

In order to get uniformity and balance in the finished frame, we use a mold to form it. This is cut out of 1" stock as will be noted from the drawing. The mold may be parted if this seems desirable for ease in inserting and removing the hot strip plastic, altho we used a solid mold.

For the frame illustrated we used a strip of plastic 3/16" x 1" x 8⅞". The ends are filed to remove the rough edges left by sawing and it is then sanded with 4-0 and 7-0 garnet paper. After sanding it should be buffed on a wheel, using buffing compound, with final polishing on a clean buff.

The strip is then heated in an oven to 250°F. Remove plastic from the oven, using gloves to protect the hands and, before it hardens, quickly bend into the mold. When cool, remove from mold and lay out ¼" groove in each upper section to receive the glass. Cut out with coping saw and then put picture between glass and assemble. Two pieces of glass 1/16" thick, 3" wide, and 4" high will hold the picture nicely and complete an attractive looking picture frame for the home. ★

Wooden mold for forming plastic picture frame.



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Flexible Steel Rule No. 306
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Novelty Holder Is Useful Item

By Ronald Nutter

Here is a take-home project that will be welcomed by shop teachers as it can be used to teach the use of the coping or bandsaw as well as internal wood turning. Ronald Nutter teaches general shop at the Thomas Jefferson Junior High School, Passaic, New Jersey.

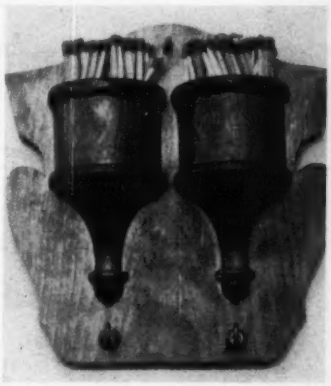
TESTED SHOP PROJECT

THERE are many designs for hot-dish-pad holders, but here is one that serves two purposes. Combined with a match holder it makes a useful article for either the kitchen or living room.

There are many designs that could be used, but the one shown was designed to match the breakfast set of the author.

The back is cut out of $\frac{3}{8}$" stock. Birch was used for this project as it finishes nicely. Use the squared lines to copy and make a card-board pattern. Transfer to the piece for the back, and cut out with a jigsaw or bandsaw. Finish the edges with file and sandpaper.

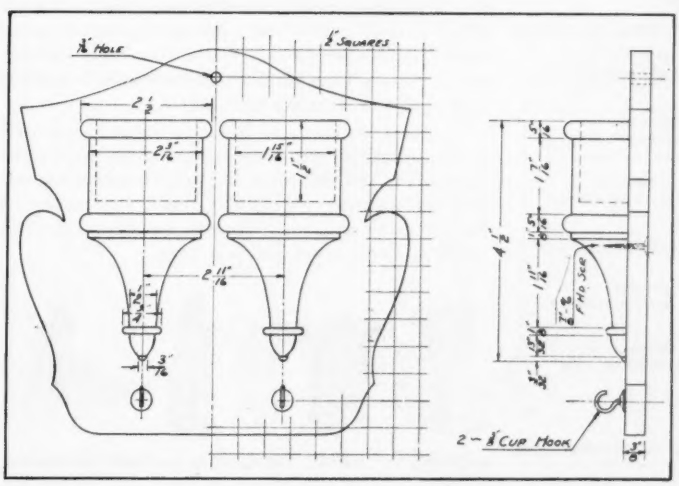
To make the match holders, use two blocks of wood $1\frac{3}{8}$" x $2\frac{3}{4}$" x 5" and glue together with paper between so that they will split apart easily after turning. Mount the block on a faceplate and turn the inside hole to finished dimensions. While it is still in the lathe rough out to the outside dimensions. Next mount a scrap of waste wood on the faceplate and turn a plug to a snug fit for the hole in the match holders, which is gently forced in. Now continue to turn the outside of the match holder to finished dimensions. After sanding smooth, remove from the lathe and split the turning along the glued line.



This match holder is useful by the fireplace or at the summer cabin as well as in the kitchen.

Mount the split turnings to the back with flat-head screws and glue.

The finish will depend on the color scheme of the kitchen where it will be used. The one shown was made from birch and finished with Min-Wax stain. Without the hooks it can be used near the fireplace. ★



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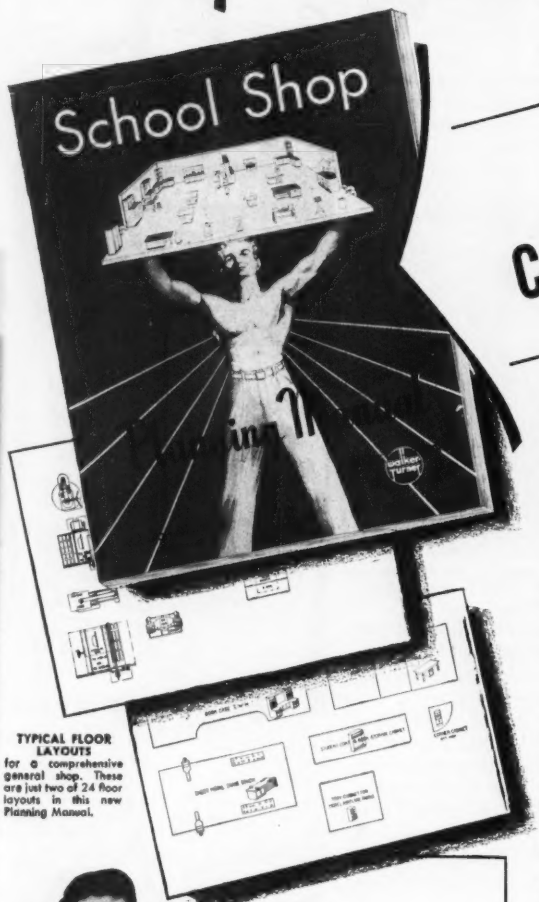

TYPICAL FLOOR LAYOUTS for a comprehensive general shop. These are just two of 24 floor layouts in this new Planning Manual.

F. C. Finsterbach is eminently fitted to prepare a manual such as this on school shop planning. His experience includes: 25 years teaching at Cleveland, Ohio; Buffalo, N. Y.; Oswego State Teachers College; Oregon State College. B. S. from Buffalo State; M. S. at Wayne University; Doctoral studies at University of Buffalo. Contributor to A. V. A. Journal, Industrial Arts and Vocational Education, and School Shop Magazine. Former supervisor New York State Education Department and recently Assistant Professor of Industrial Arts. Now Director of Education, Walker-Turner Division, Kearney & Trecker Corporation. Member Epsilon Pi Tau and Phi Delta Kappa.

Partial List of Contents

- ★ Major Essentials for School Shop Planning
- ★ Illustration of Planning Principles
- ★ Architectural Details
- ★ The Planning Center in a School Shop
- ★ Suggested Equipment for a Comprehensive General Shop

for successfully planning your school shop

48 pages (8½" x 11") Over 750 silhouettes of shop equipment

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The author of "School Shop Planning" recognizes that there are essential differences stemming from the aims or purposes of each branch of industrial education, and that "the planning of the shop (should) reflect these differences, not so much in arrangement but in multiplicity of equipment, and in emphasis of instruction".

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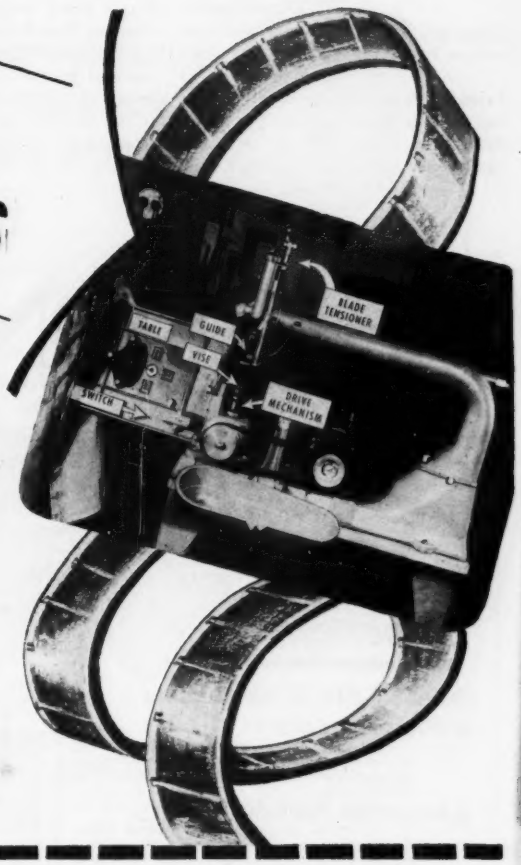

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Diamond Dust

Abrasive comments from that doughty Scot, Tom Diamond, former head, Department of Vocational Education, University of Michigan, Ann Arbor.

Everybody Works —Even Father

THERE are few men who have not marvelled at the ingenuity displayed by Friend Wife in devising different tasks for the less important member of the family to perform. They are many and varied and range from releasing a more or less defunct mouse from a trap to doing something about a leak which developed recently in the attic of the family mansion.

These examples are given first priority since a postponement of "Operation Mouse" is certain to lead to bitter recrimination because of the objectionable aroma which begins to permeate the domicile. And the roof incident is likely to lead to a further lack of harmony because of the effect on the interior decorations.

The husband, poor fellow, has just returned from his job with his tongue hanging out and his tail dragging and he resents being confronted with anything that involves *work*. He respects work—in its proper place—but he has a strong conviction that his home is not one of the places. If he is stubborn about it, however, and ignores the call to duty, there is only one alternative—someone must do the work for him.

And so it is in every phase of life, there is work to be done, and someone must do it if progress is to be made. Any individual may refuse to do his share, but what he leaves undone will have to be done by others or the standards in the community will be lowered.

Because of this it is important for industrial-arts teachers to impress on their pupils that, when they go out in life, and wherever they go, everyone must work and that what they get out of life depends entirely on the effort they put into it.

As an illustration of the need for work there is a story told about an individual named Sam who lived in the days when people lived like animals in caves.

Sam was just an ordinary citizen who lived in a cave in the wilds of a primitive country. Sam's inclination was to while away the hours pleasantly, resting comfortably in the shade of a huge oak tree which grew near by. Unfortunately, from Sam's point of view, as the day wore on the pangs of hunger disturbed him so that he was forced to think of food. The more he thought about it, the greater became his desire to eat.

Since his wife was busy with the household chores, he came to the conclusion that, if he expected to eat, he would have to bestir himself and do something about procuring it. This meant that he would have to find some game in order to feed himself and his family. (It should be noted here that this hunting expedition was not sport, it was *work* which *he had to do* before he or his family could eat.)

As the family grew to maturity his daughters with encouragement from their mother began to clamor for a new and more modern type of home. They wanted to have their friends around and the cave in which they lived left much to be desired from the standpoint of entertainment possibilities.

After a period of resistance, Sam finally agreed to do something about the matter. In discussing the project with some of his friends, he learned about a community where the people lived in wooden houses and where the standard of living was definitely higher than the one to which he was accustomed.

Although the change made necessary a long and arduous journey, Sam was

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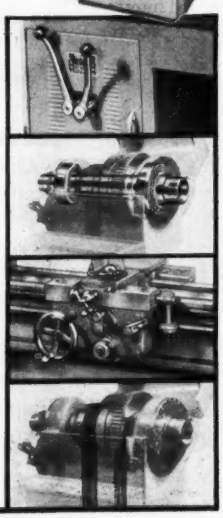

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under pressure from his family so he collected his belongings and started off to find a new place of abode. Rivers, lakes, and forests had to be crossed on the journey. And all the time the family had to be fed, hostile tribes had to be fought, and wild beasts had to be destroyed. Finally, they reached their goal and, with the aid of friendly neighbors, built for themselves a beautiful log cabin.

During the journey, every member of the family had to work and work hard. They received no pay for this work; their reward came in the form of a higher standard of living. (The principle involved here is that when the position or form of anything has to be changed, work must be done by someone.)

Sam's family was delighted with the new home but they still had problems. Sam had daughters. A few miles away there lived a young fellow who was constantly making trouble for his neighbors, and he admired one of these girls who had come into the neighborhood. The young lady had her own ideas about men, and this lad did not rate very highly in her estimation. In spite of her objections, the youth took his club and proceeded to beat her into submission. Sam, however, being aware of the lad's shiftless habits, gave battle to the youth and finally succeeded in chasing him away.

Here again Sam had to *work* to save his family from attack. It should be noted in all these situations that Sam did not work because he wanted to exert himself. As a matter of fact, he would have preferred to continue his siesta under the oak tree. But he loved his home and his family so his desire was to protect them. Moreover, he considered it his responsibility to do so, and, being a good citizen, he *worked* to discharge this responsibility.

What was true in those primitive times is just as true today. Man must work, and work hard, if he is to meet his responsibilities to his home, his family, and his country. This may seem elementary, but if an industrial-arts teacher can imbue his pupils with this philosophy the question of what manipulative skills they have developed becomes relatively unimportant.

Safety in the School Shop

NEXT month SCHOOL SHOP will bring you the full story on safety in the shop with specific applications in the various areas of shopwork and an important article on the legal liability of shop teachers for student accidents. Look for the April Safety and Directory Issue of SCHOOL SHOP!

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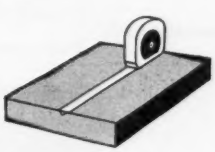
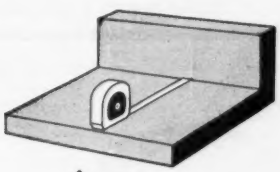
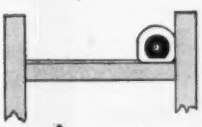


Patented, self-adjusting end-hook permits accurate hook-over measuring.

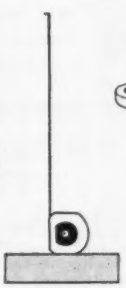


Self adjusting hook permits accurate butt-end measurements.



Self adjusting hook makes inside reading accurate and easy. Simply add exactly 2" to the reading.

Rigid blade and flat design of case makes vertical measuring easy.



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Storing Band Metal

Band metal and tubing are frequently stored so that only the ends can be seen. Under these circumstances pupils are apt to cut what they need from a full-length piece when, as a matter of fact, there may be several short lengths in the rack.

In order to overcome this difficulty and to encourage pupils to use the short lengths first, the visible ends of the full-length pieces are painted a bright color. By this means pupils learn to examine the short pieces to discover if they are long enough for their purpose.

This has the added advantage that it simplifies the task of taking inventory. *—David E. Wilson, Haddon Heights High School, Haddon Heights, N.J.*

Issuing Sandpaper

To prevent wasting sandpaper and to avoid having scraps of it lying around on the floor at clean-up time, I have found this method effective. Cut the 8" x 10" sheet of sandpaper into quarters (4" x 5"), and issue it to the student when he needs it. Require him to turn in his old piece before he can get more. You can then tell at a glance if he needs a new piece.*—F. A. Thoendel, Assistant Professor of Industrial Arts, Nebraska State Teachers College, Chadron.*

Cleaning Erasers

Pencil and ink erasers that become dirty can be cleaned with gasoline applied with a clean piece of cloth. This makes them just as efficient as new ones. *—C. H. Niemann, Morton Junior High School, Hammond, Indiana.*

Protect Your Varnish Brushes

When painting or varnishing a project which stands on the floor or bench the brush is apt to pick up dust or dirt from the floor or bench top. This difficulty may be overcome if flat-head nails are driven into the base or ends of the legs. The nails should protrude about 1" or more, and can be withdrawn when the job is finished.*—James B. Lidstone, The Edward Devotion School, Brookline, Mass.*

Dividing a Board

Any width board may be simply divided into any equal number of parts. Place a ruler or steel square diagonally across it. Select a number of inches between any two points that can be evenly divided by the number of parts into which the board is to be divided. Use this quotient to determine where to make points on the board. The angle of the ruler is of no importance so long as the inch marks coincide with the edges of the board.

For example: a board is to be divided into four equal parts (the width of the board need not be known). Place the ruler on the board at an angle so that the zero end coincides with one edge of the board, and the 16" mark with the other edge. Mark on the board the 4", 8", and 12" points. If lines are drawn through these points parallel to the edges, all four parts into which they divide the board will be of equal widths. Any other numbers divisable by the number of parts into which the board is to be divided could be used.*—Melvin Ham, Industrial-Arts Instructor, Choteau, Mont.*

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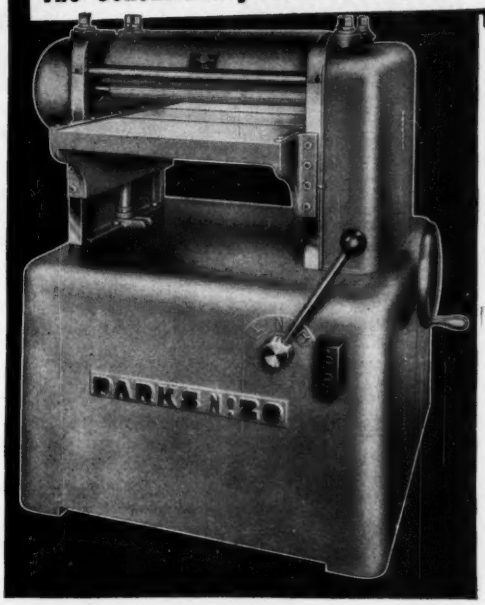

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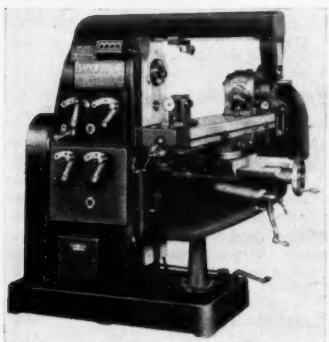

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Books:

Servicing TV in the Customer's Home. Kiver. Indianapolis: Howard W. Sams & Co., Inc., 1951. Pp. 96. $1.50.

This book is intended primarily to help the serviceman who calls at the customer's home. It should serve this purpose well since it is written in easy-to-understand language, and is well illustrated. However, it should be a valuable addition to the teaching material used in those vocational or technical schools where TV is included as a part of the electrical course.

Milton S. Kiver is president of the Television Institute, and has had wide experience as a serviceman.

Simple Upholstery. Hart and Halliday. Peoria: Chas. A. Bennett Co., Inc., 1951. Pp. 59. $1.25.

Teachers of industrial arts who wish to introduce simple upholstery as a unit in their program will find this book very helpful. It is written in simple language, and each step is illustrated so that a pupil can follow the directions without difficulty.

The authors, Dorothy M. Hart and John Halliday, are English, and published the book originally in England for use by children of junior-high-school age.

Basic Refrigeration—Principles, Practice, Operation. King. Chicago: Nickerson & Collins Co., Publishers, 1951. Pp. 526. $6.00.

Basic Refrigeration is written in the language of the student, yet recognizes the requirements of the refrigeration instructor. It progressively takes the student from fundamentals to complete systems. It is supplemented by a large number of illustrations and graphic charts. The author has drawn on a wide and varied experience in the practical aspects of refrigeration coupled with many years of teaching the subject.

The author teaches refrigeration in the Santa Monica, Calif., Technical School.

Inspection and Gaging. Kennedy. New York: The Industrial Press, 1951. Pp. ix + 502. $7.50.

This book is profusely illustrated, and it presents in easy-to-understand language how inspection functions in industry. The various types of measuring instruments are shown, and directions are given for their proper use. It gives suggestions to inspectors for improving their accuracy and efficiency.

It should serve as a text or a reference book to be used in the training of inspection personnel, and it should be helpful in school shops where precision work is being done. Perhaps its greatest value from the standpoint of industrial arts lies in providing the pupils with a better understanding of precise measurement and the reason why it is an essential in modern industry.

Clifford W. Kennedy has had wide experience as an engineer, and is now quality control engineer for the Federal Products Corporation, maker of precision measuring equipment.

Your Puppetry. Wright. Peoria, Ill.: Chas. A. Bennett Co., Inc., 1951. Pp. 135. $2.75.

The art of puppetry involves many skills which appear in the various activities carried on in the public schools, and it involves a great number of occupational skills. Moreover it provides opportunities for the development of creative ability, originality, and craftsmanship in woodworking, carving, drawing, and painting, as well as in other manipulative areas.

For these reasons this book offers valuable suggestions to teachers of handwork, particularly in those grades where free expression is stressed.

John Wright has made a life study of his subject, and has been instrumental in developing a wide interest in it, both in his native South Africa and in his present home in England.

Pamphlets:

How to Simplify Radio & TV Repairs. Free to readers of SCHOOL SHOP. This pamphlet is issued by the Feiler Engineering Co., Skokie, Ill. In it there is presented a new stethoscope method of testing radios which is simple and positive. Shop teachers who are interested in radio repairing will want to examine this new system. The pamphlet is well illustrated and is full of suggestions.

Audio-Visuals:

Filmstrip Series. A series of six filmstrips has been produced by the Popular Science Publishing Co. in conjunction with Walker-Turner Div. of the Kearney & Trecker Corp. Basic operations are shown on the jig saw, drill press, band saw, shaper, and circular saw. A teaching guide plus student questions are included. Full information on the series is available from the Educational Dept. SS2, Walker-Turner Div., Plainfield, N. J.

Airplanes and How They Fly is a one-reel film released by Young America Films, Inc., 18 E. 41st St., New York City 17. It is suitable for middle grade and junior-high students. $40 a print, or can be rented from film libraries.

Radio . . . . . *from page* 11

Harold: I don't think John showed me the printing area.

John: Golly, I forgot.

Mr. Stark: The printing area is located over in the south side of the shop. See the printing press and different type boxes?

Harold: Oh yes . . . now I see them. It's a little printing press, isn't it?

Mr. Stark: A little small but we can make all sorts of cards, letterheads, and the like. We even print the first page of the school newspaper with it. By the way John, did you show Harold the project display case?

John: No, I didn't.

Mr. Stark: Would you like to see some of the projects that are made in the shop by the students, Harold?

Harold: Sure would.

Mr. Stark: Come on over by the display cabinet and I'll show you. Say, by the way John, did your father like the sail boat you made?

John: Oh, he thought it was great. We're going to build a large one this next summer.

Mr. Stark: What do you think of all these projects, Harold?

Harold: Boy, they're swell. What's that one in the corner?

Mr. Stark: That's a hair clip. One of the girls in the 8th grade made that. There's another over there. That one is made from brass, then nickel plated and polished. Looks nice doesn't it?

Harold: Yes, it does.

Mr. Stark: Here are some projects made from metal . . . letter holder, hammer, clamp, and chisel. Over there is a birthday card a boy in the 7th grade designed and cut from a linoleum block. It was then mounted and the card run off on our printing press. On the second shelf are the woodworking projects and plastics. Did you ever work in plastics?

Harold: No, but I've seen it done at the county fair.

Mr. Stark: Here's a ring and bracelet made from plastics.

Harold: Golly, they don't weigh very much do they?

Mr. Stark: No, they are not heavy . . . Here's an interesting project. It is a ring with the setting made from a very pretty stone. The process of cutting the stones is called lapidary work . . . Over there are some electrical projects. A buzzer, motor, crystal radio, and an electronic device to put the porch light on when it gets dark outside. Bernie Hale made the porch-light project.

Harold: Oh yes. I met him, he seems to be pretty good in electronics, doesn't he?

Mr. Stark: Yes, he's quite interested in the field of electricity. After he graduates he is going to work at the radio repair shop in town. Then, when he has saved enough money he plans to go to college to be an electrical engineer. Do you plan to go to college, Harold?

Harold: No. I don't think so. I really don't know what I want to do. I've never had the opportunity to decide. I hope the principal assigns me an industrial-arts class. I bet I could find something that would interest me here. I've always been handy at building things around home. Gosh, but you sure have all kinds of machines in here. I'll bet it cost a lot of money to make a shop like this?

Mr. Stark: Oh, not so much . . . A shop like this costs around $5000 but after it is set up it costs only about $400 a year for supplies . . . Of course it isn't the cheapest form of education,

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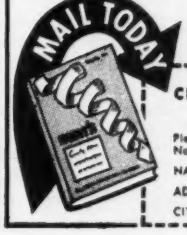

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but it certainly contributes a lot to you young fellows and girls. You see, by working in the shop you get to work with other fellows, help them out and they in turn help you. You can make things you're interested in and get a lot of enjoyment from doing it. Not only that, it helps you get along with your fellow classmates because working in the shop is like working with people outside of school at your chosen vocation . . . Yes, it costs money to set up an industrial-arts shop but it is worth every penny it costs and then some.

SOUND: MUSIC UP AND OUT.

Narrator: Yes sir, the schools of today are meeting the needs of youth. Whether it be an industrial-arts shop, as you heard today, or a home-making course, agricultural activity, or a social-science class. All are contributing factors to help guide and direct your youngsters as long as they are within reach.

You know, I mentioned all of you were stockholders in the business called education. Do you know what your dividends are? . . . Let me tell you . . . The dividends are your children educated in a way that will better fit them for this complex, changing world. A generation of critical-minded individuals directed and guided in a democratic way to fulfill their purpose in life, and contributing to the well being of all members of our society.

SOUND: MUSIC IN AND OUT.

Announcer: Tonight's play was written by Marshall L. Schmitt, Associate Professor of Industrial-Arts Education, State College, Raleigh, North Carolina.

SOUND: MUSIC IN AND OUT.

END

Press . . . . . *from page 9*

there is no, or very little, taper to the glass, as shown in the photograph on page 8, it will not be necessary to consider this in laying out the design. In this case, all lines that will appear horizontal on the finished job will be straight lines, not ares, in the design. However, if there is a large degree of taper to the glass, Figure 15, it will be necessary to allow for it in laying out the design.

To do this three dimensions must be known: the largest diameter (shown in Figure 15 as *A*), the smallest diameter (*B*), and the vertical height of the glass (*C*). These dimensions are laid out on a piece of paper and the lines, representing the sides of the glass, are extended until they intersect, locating point *D*. Now the design is positioned on the glass as desired. In order to print a color band around the glass, shown in Figure 15 as *E*, the following must be done. With *D* as a center, a compass is set for a radius that will reach from *D* to the top of the design and inscribe an arc (radius *B*). With *D* as a center, the compass is then set for a radius that will reach to the lowest point on the design (radius *C*) and inscribe an arc. The area enclosed by these two arcs limits the space in which the design (shown as *E*) must appear if it is to print in a horizontal plane. To determine the distance the design is to extend along these arcs, it is only necessary to multiply the largest diameter (*A*) by Pi (3.1416) and lay out this dimension

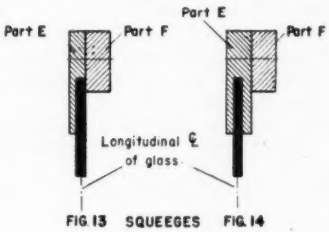

FIG. 13 SQUEEGES FIG. 14

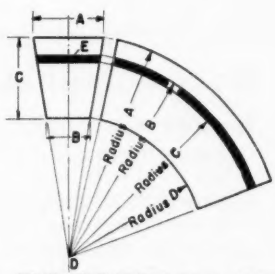

FIG. 15 DEVELOPMENT OF A DESIGN

along an arc constructed from *D* with a radius shown as radius *A* in Figure 15. At the extremities of this distance, the points should be connected to *D*. In so doing, a development of the glass is made which will also limit the length of the color band. Radius *D* will give the lower limit of the glass if it is needed for the placement of the design. Ordinary silk-screen process paint is not suitable for painting glasses as it will scrape off with the wear of dish washing. For permanent adherence a baking enamel should be used. Most suppliers of silk-screen materials have such baking enamels in various colors which can be used as they come or mixed to get different shades. Temperature for baking is usually 275° F. at one hour for light colors. ★

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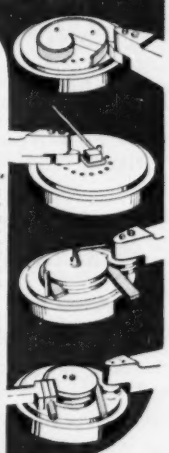
The exact methods of producing various types of bends in a wide range of materials are illustrated, step by step, with over 90 diagrams and charts together with valuable tooling suggestions.



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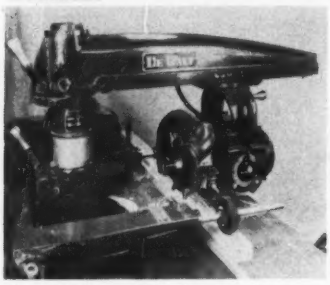
News from INDUSTRY

Radial Arm Saw Gets Safety Treatment



The kickback which has sometimes prevented shop instructors from using radial arm power saws for rip-type operations in school shops has been remedied by the use of a power-feed unit. Two spur wheels, mounted on flexible arms and driven by a ¾ hp motor, move material to and from the cutting or shaping unit, and remove it from the saw blade.

The spur wheels can be adjusted vertically and horizontally for different widths and thicknesses of material. The unit can be mounted with brackets on the table frame of most standard tables. Production-conscious instructors may also find the variable-speed-operation factor of interest.

Additional information may be procured by addressing DeWalt Products, Lancaster, Pa., mentioning SCHOOL SHOP; *or check no. 50 on the coupon.*

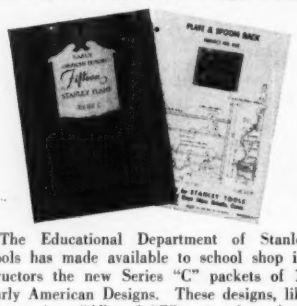
Delco-Remy Educational Aids

Delco-Remy Education Program is a new booklet published by the Delco-Remy Div. of General Motors, describing with color and illustrations the educational aids now available to shop teachers. Included among these are handbooks, instruction manuals, charts, and slide films.

Another feature of the new brochure is a description of the Delco-Remy Service School and School Shop which offer special summer classes for vocational- and trade-school instructors. These lecture sessions and shop periods deal with automotive electrical equipment and provide exact technical data as well as opportunities for group discussion.

Free copies of *Delco-Remy Education Program* may be obtained by writing the Technical Editor, Service Dept., Delco-Remy Div., General Motors Corp., Anderson, Ind., mentioning SCHOOL SHOP; *or check no. 51 on the coupon.*

Stanley Presents New Design Series



The Educational Department of Stanley Tools has made available to school shop instructors the new Series "C" packets of 15 Early American Designs. These designs, like the previous "A" and "B" series, have been adapted from museum pieces to serve a useful place in modern homes.

Drawn by William Klenke, each plan sheet contains a working pattern, 8½" x 11", punched for loose-leaf binder. The miniature projects are attractive and useful as cigarette trays, jewel boxes, bedside stands, magazine racks, and other household conversation pieces. Suggestions for finishing are included.

Series "C" (15 plans) is available for 25c from the Educational Dept., Stanley Tools, New Britain, Conn. (please mention SCHOOL SHOP); *or check no. 52 on the coupon and enclose 25c.*

U-Mak-It Offers Outboard Cabin Cruiser

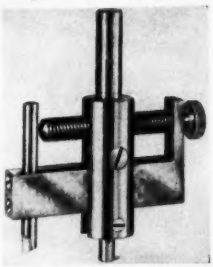
The Flying Cloud 18′ Outboard Cabin Cruiser, offered for school shop or home assembly by U-Mak-It Products, can be purchased and assembled in three separate kits; hull, cabin, and cabin top and windshield. Building time by a craftsman is estimated at 60 hours plus an additional 30 hours for the cabin.

The v-bottom hull is planked with ⅜" marine plywood and batten reinforced. Hardwood frames are assembled and bevelled. Stem and transom are also machined and bevelled. The transom is made of one-piece five-ply marine plywood, reinforced with hardwood framing. The cockpit has two seats on each side and folding pilot seat.

The cabin has a double folding door, two bunks, locker space. Cabin sides are ⅜" marine plywood, ready for the installation of interior windows, a swinging forward window, and bulkhead window. The deck is covered with ¼" marine plywood with hardwood frames. Cockpit rails, forward deck rails, windshield, and hand rails are all mahogany.

For details, write U-Mak-It Products, 701-725 Whittier St., New York 59, N. Y., mentioning SCHOOL SHOP; *or check no. 53 on the coupon.*

Micro Circle Cutters Feature Versatility



Versatility and sturdy construction are two of the features that make Micro Circle Cutters ideal for school shop use in that they are equally efficient with plastics, wood, and metals ranging from stainless steel to magnesium.

Adjustable to a great number of hole diameters within their respective ranges, Model 1 has a maximum cutting diameter of 4", and Model 5 a maximum diameter of 6". All models have high-speed-steel cutting bits. The micrometer adjusting feature assures precise settings at all diameters. A new method of locking the beam is said to facilitate operation. Two types are available for round-shank chucks, and a square shank is available for hand braces.

More information may be obtained by writing Precise Measurements Company, 942 Kings Highway, Brooklyn 23, New York, mentioning SCHOOL SHOP; *or check no. 54 on the coupon.*

Simonds Introduces New Si-Clone Line

Simonds Saw and Steel Company of Fitchburg, Mass., has recently announced a new, high quality line of Si-Clone saw blades suitable for school and home workshops, as well as commercial use.

The complete line includes the following saw types: rip; regular cut-off; flooring cut-off; fine tooth cut-off; easy-cut; planer (hollow ground combination); No. 52, No. 54 and No. 60 combination; carbide tipped; dado; nonferrous; and friction. Furnished up to 12" in diameter, these saws come with round or

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special shape center holes for use on table radial-arm or electric hand-saw machines.

For more information, write Simonds Saw and Steel Co., Fitchburg, Mass., mentioning SCHOOL SHOP; *or check no. 55 on the coupon.*

New Literature

Brake Service Training Course is offered to vocational school instructors covering both theory and practice on automotive brake systems. Training material includes student text, instructor's guide, film strips, check questions, and written test. For details and brochures write the Barrett Equipment Co., 21st and Cass, St. Louis 6, Mo., mentioning SCHOOL SHOP; *or check no. 56 on the coupon.*

Kilns and Furnaces. Western Materials Co. (Equipment Div.), 39 S. LaSalle St., Chicago 3, Ill., has announced the availability of new literature on all types of school shop furnaces, kilns, and ovens for every purpose. Included is information on a new small gas-fired Speedy-Melt furnace with an improved motor-blower unit, and complete with crucibles. Write the company, mentioning SCHOOL SHOP; *or check no. 57 on the coupon.*

Standard Tool Calendar contains useful data for shopwork in general, descriptions of various tools, and tables of decimal equivalents and cutting speeds. Write for free copy to Standard Tool Co., 3950 Chester Ave., Cleveland 14, Ohio, mentioning SCHOOL SHOP; *or check no. 58 on the coupon.*

News

HAPPENINGS IN INDUSTRIAL EDUCATION

Massachusetts Survey

INDUSTRIAL education in Massachusetts will be surveyed by an independent agency for the Filene Foundation in order to ascertain the normal needs of Massachusetts industry for vocationally-trained personnel and to study existing programs. Proposals for strengthening the trade and industrial education program will be made. Industrial Development Reports of Boston is conducting the survey under the direction of William M. Stoddard.

NAM Urges Support of Education

THE board of directors of the National Association of Manufacturers has gone on record urging its members to secure adequate local, state, and private support for elementary and secondary schools and to exert every effort to make available to higher education the supplemental private support needed to meet the educational needs of youth, industry, and the nation. While still opposed to federal aid to education, the NAM recognizes the "freeze" in school support now confronting the nation because of inflation and competition for the tax dollar. If local industry follows its lead, the task of gaining support for community school programs will be aided.

New Chicago School

FIRST on the list of new buildings to be constructed in Chicago, Illinois, is the Dunbar Vocational School which is slated to be housed in a three-million-dollar structure. Faculty members are now participating in the planning of the shops.

Technical Institute Burns

THE State Institute of Applied Arts and Sciences at Binghamton, N. Y., was destroyed by fire recently. Most of the technical equipment, valued at more than half a million dollars, was lost. Temporary quarters have been established and a new permanent campus is planned.

New Ph.D.'s at Minnesota

TWO men have recently been awarded Ph.D. degrees at the University of Minnesota under the advisership of Professor Homer J. Smith. They are Raymond H. Larson, St. Cloud, Minnesota, and Gustave S. Wall of Minneapolis.

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Personnel of the "Educational Lumber Division" have many years experience in Hardwood Lumber, Sales and Service to Educational Institutions.

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TEACH IN CHICAGO

Examinations for teachers of the following subjects in the Chicago Public High Schools will be held April 28, 1952:

Auto, Electric, Forge, Foundry, Industrial Arts, Mechanical Drawing, Print, Machine and Wood Shops. Closing date for filing formal application forms and required credentials is April 14, 1952. *For information apply to*

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Washington . . . . *from page 32*

people can prevent the tensions which lead to the necessity for using those weapons.

The schools must therefore educate for better health, better citizenship, better world understanding. In short, the country must come out for a stronger educational system from kindergarten to college and must spend the necessary money if the national security is to be underwritten. But, please read on.

SCHOOL SHOP was at the press interview and threw some questions at the interpreters of the report:

SCHOOL SHOP: "What attention was given by your groups to the role of vocational education?"

Dr. Conant: (Shaking his head in the negative) "Well . . . . .?"

Dr. Adams: "It wasn't considered as a special problem; it was considered as part of the over-all role of the schools."

SCHOOL SHOP: "Then your policy-makers don't believe vocational education has a role to play similar to the role of 1940 when it trained millions of defense workers?"

Again there was shaking of heads and puzzled looks and it was obvious to your reporter that the two august groups had not grappled with this question. Then up spoke Wilbur Murra, a Policies Commission staff member: "If you turn to page 20 of the report you will find the section on vocational education." Since it is short, the section can be quoted in its entirety: "A major part of our national security rests upon our ability to prepare young people to become efficient producers. The best programs of vocational education consist not alone of training in specific skills but also of comprehensive learning experiences which equip the student to become a fully effective member of a production team. Such a curriculum stresses human relations and civic responsibility as well as technical proficiency."

Other members of the Policies Commission said after the press conference that educators would deplore quickie training courses, would insist on broad-gage vocational education during this period of part-peace, part-war.

A Change in Emphasis.—That best seller, *Improving Instruction in Industrial Arts*, is in the hands of a group of editorial and curriculum doctors—to be strengthened, invigorated. This is the second revision of that popular AVA bulletin since it first came into the world in 1929. From the looks of the tentative, still-to-be-revised outline we have seen, the finished bulletin should become a classic for industrial arts.

Leading the AVA group in revising the publication is Chris Groneman, head of the department of industrial education, Texas A & M College. He and his colleagues are planning to have finished copies by the middle of 1952.

The new document will give more space to the outcomes which should be expected from industrial-arts education.

The bulletin will say that industrial-arts teachers should first strive for worthy attitudes, interests, and habits. Next to strive for are elementary skills in the use of tools, machines, and materials. Third goals are general useful information and—this is new—cultural information. New also will be the emphasis on three other outcomes to be expected—problem-solving skills, ability to plan, creative expression.

Many industrial-arts teachers found the list of learning units the most valuable part of the older bulletin. Learning units will be renamed "desirable learning-experience areas." The emphasis on mechanical drawing will be toned down. Instead, general drawing and how it can be applied to wood, sheetmetal, machines, aircraft, home planning, electrical and topographical projects will be treated in some detail.

The section on general woodworking will cover furniture making, model making, patternmaking, carpentry, upholstering, and finishing.

Under general metalworking (note the stress on "general") will be grouped suggestions for teaching plumbing,

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metal spinning, welding, jewelry, forging, machine shop, sheetmetal, foundry, ornamental iron, and art metal.

Former sections on electrical work, plastics, leather, concrete, ceramics, home mechanics will be retained.

The graphic-arts section, however, will be expanded to take in hand composition, letter press, silk screen, linoleum blockprint, bookbinding, type casting, plate making, and etching.

A brand new section on transportation will cover projects on the automobile, aeronautics, bicycles, roller skates, trains, skis, motor scooters, and cycles.

Convention Calendar

New Jersey Vocational and Practical Arts Association, Asbury Park, N.J., March 20-22.

Indiana Industrial Education Association, French Lick, Ind., March 27-29.

Ohio Industrial Arts Association, Deshler-Wallick Hotel, Columbus, March 27-29.

Texas Vocational Association, Shamrock Hotel, Houston, April 3-5.

Illinois Vocational Association, Congress Hotel, Chicago, April 3-5.

California Industrial Education Association, Laney Trade and Technical Institute, Oakland, April 4-5.

Michigan Industrial Education Society, Municipal Auditorium, Grand Rapids, April 17-19.

Missouri Annual Industrial Education Spring Conference, Columbia, April 18-19.

Connecticut Industrial Arts Association, Teachers College of Connecticut, New Britain, April 18-19.

American Industrial Arts Association, Congress Hotel, Chicago, Ill., April 30-May 1.

Wisconsin Association for Vocational and Adult Education, Loraine Hotel, Madison, May 9-10.

Georgia Vocational Association, Municipal Auditorium, Savannah, June 9-10.

International Graphic Arts Education Association, Madison, Wis., June 29-July 2.

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By MICHAEL PACA

The Job Ahead.—This country is strong because it produces goods and services in mighty quantities, said President Truman, as he set down the tasks facing the Congress and the nation in 1952. But we must grow still stronger, produce still more, he insisted in his three yearly messages on the State of the Union, on our economic progress, and on the government budget for the 12 months ending June, 1953.

To support his messages, President Truman used long tables and complex charts. But the central ingredient of his data is the figure $300 billion. That is the total value of American output a year (goods and services). Twenty years ago it was a utopian figure, used by dreamy-eyed economists. Ten years ago, it was a goal to work for. Today, President Truman thinks the country must pass this figure, increase it by $20 billion a year. Since most people who can work are already on the job, the increase can be gotten only by developing more skills, sharpening the skills we already have in the economy, and by using more machinery—which in turn requires skilled workers.

SCHOOL SHOP takes pleasure in announcing that beginning this month Michael Paca will again bring its readers his pertinent commentary on the Washington scene as it affects industrial education.

The Budget Bureau Says "No."—The president's 1953 Budget disappointed vocational educators—again. The Bureau of the Budget can't get out of that $19,100,000-groove. That's the sum it wants the Congress to approve, despite the fact that the George-Barden act authorizes $29,300,000 a year.

As this is written, Assistant Commissioner for Vocational Education Gregory and his staff are preparing to justify to Congress the Budget Bureau figure of $19,100,000. Strict government protocol would prevent him from asking for the $29,300,000—though you can be sure he is eager to do so. Actually, he has facts to prove that local schoolmen have asked for services requiring a federal outlay of $13,000,000 over the $19,100,000. In other words, the bare federal minimum for vocational education is talked of as being a total of $32,000,000. This larger figure could give Gregory & Co. a talking point to persuade Congress to compromise for $29,300,000.

But if Gregory & Co. cannot ask for the larger sum, one Washington group can and will. "You can be sure that the American Vocational Association will fight for the full authorized figure," says M. D. Mobley, AVA executive secretary.

Vocational-Education Needs.—Let's take a closer look at what the states think they need next year to bring more vocational education to more people.

State and local agricultural educators have requests for 750 new "ag" departments, requiring 1075 additional teachers, at a cost of $3,507,192.

Home economics educators have requests for 771 new departments, requiring 1493 additional teachers, at a cost of $3,247,074.

Trade and industrial educators have requests for 548 new all-day programs and 436 diversified occupations programs, requiring 2218 new teachers, at a cost of $4,320,048.

Distributive educators have requests for 456 new programs, requiring 817 additional teachers, at a cost of $1,867,270.

In addition, the states report there is a demand for 1877 new vocational guidance counselors.

During the first year at least, this expansion can be made without any additional money going for administration, supervision, or teacher training. The total of $13,000,000 needed for expansion, therefore, is a lean figure, the Office of Education believes. Yet, it is a figure which could bring vocational education to at least some of the 60 percent of people who need it but do not have access to it.

Vocational Education "Was also Mentioned."—Some people call the Educational Policies Commission the brain trust of American education. Others apply the same compliment to the American Council on Education. When these groups put their heads together and speak out on a hot issue of the day, it becomes an event no schoolman can ignore.

The hot issue today is how education can strengthen our defense. And the combined powerhouses in educational thinking spoke out in a 30,000-word statement called *Education and National Security*.

To give reporters an advance look at the document, the two sponsoring groups called a press conference. James B. Conant, Harvard president, spoke for the Policies Commission; Arthur S. Adams, for the American Council on Education. Each said that educators seldom agree on anything but that the new statement came close to a unified answer to the question of education's role in the emergency. It is simply this: Education must become better, must go deeper, must reach out to take in an ever-widening circle of children and adults. Only trained people can make and use atomic guns and jet planes; only an educated

(*Continued on page* 30)

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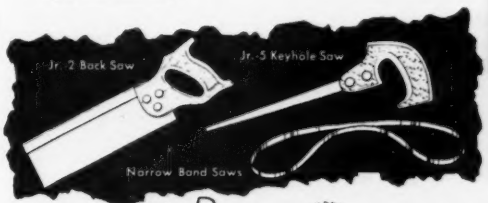

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DR. W. W. THEISEN
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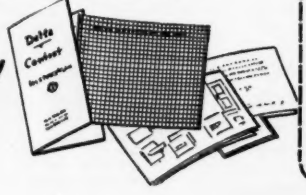

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